

REMARKS

This paper is responsive to a Final Office Action mailed November 28, 2007. Prior to this response, claims 1-21, 23, and 25-44 were pending. After amending claim 1, 3, 25, 28, 32, and 35, canceling claim 2, and adding claims 65-66, claims 1, 3-21, 23, 25-44, and 65-66 remain pending.

In Section 2 of the Office Action claims 1-21, 23, and 25-44 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description. In response, the Applicant has amended claim 1 to recite “the previous step”, instead of “a previous step”.

With respect to claim 25, the Applicant notes that this claim introduces additional limitations that are performed concurrently with the previously recited step of “using a 2N-shot laser irradiation process....” Support for this limitation can be found in the specification on page 23, lines 8-19, in the explanation of Step 1407. Support for claim 28 can be found in the specification beginning on page 23, line 20, and continuing to page 24, line 3, in an alternate explanation of Step 1407.

Claim 35 is a process performed concurrently with the DS annealing step (Step 1418). Support for this limitation can be found in the specification on page 25, lines 9-22, in the explanation of Step 1422.

In Section 3 of the Office Action claims 25 and 26 have been rejected under 35 U.S.C. 112, second paragraph, as indefinite. The Office Action states that there is some confusion between the recitation of “steps” in claim 2, and the use of 2 different laser sources in claim 25. In

response, the Applicant notes that claim 2 (now canceled) recites the use of a “first” laser in the performance of the first and second steps. The third laser is used independent of the first laser. As noted on page 23, lines 8-19, the annealing that occurs in Step 1410 is a result of summing the energy densities of the first laser with an additional energy source, such as the third laser. Claim 25 has been amended to recite that the third laser is used to anneal the first area, but that the third laser is not part of the 2N-shot process.

A similar analysis applies to claim 28. As an alternative to the use of a third laser as an additional energy source, Step 1407 may employ a lamp, so that the annealing that occurs in Step 1410 is a result of summing the energy densities of the first laser and the first lamp, as explained in the specification on page 23, line 20, through page 24, line 3.

Likewise, claims 32 and 35 have been amended for greater clarity. These claims recite that the second area may be exposed to an additional energy source during the DS process (see Fig. 14 - Step 1419, page 26, lines 1-23), that is independent of the DS energy source.

In Section 5 of the Office Action claims 1-21, 23, and 25-44 have been rejected under 35 U.S.C. 103(a) as unpatentable with respect to Sposili et al. (“Sposili”; US 6,908,835 or WO 02/086954) in view of Yamazaki et al. (“Yamazaki”; US 5,894,137), and Fukunaga et al. (“Fukunaga”; US 2004/0142543) or Kawasaki et al. (“Kawasaki”; US 6,653,657). The Office Action states that Sposili discloses a SLS process that allegedly includes both a 2N-shot laser annealing process and a DS annealing process. The Fukunaga, Kawasaki, and Yamasaki references

are introduced to address the subject of devices and catalysts. This rejection is traversed as follows.

Beginning on line 26, on page 35 of the WO patent, Sposili states that Figs. 13A-13D describe various stages of SLS processing. On page 36, line 5, Sposili states that Figs. 13A-13D show irradiation where sample 40 has already undergone a SLS process, is then rotated 90°, and again continuously translated in the Y-direction. In Fig. 13B, the annealed areas solidify. In Fig. 13C, the sample is again translated in the Y-direction (page 36, ln. 17), and in Fig. 13D the sample re-solidifies.

To more clearly distinguish the claimed invention 2N-shot process from Sposili's SLS process, claim 1 has been amended to recite that the 2N-shot process is accomplished through the use of orthogonal aperture patterns. Support for this amendment can be found in the specification on page 6, lines 15-17, and claim 2, as initially filed. Page 6 of the specification states that each (orthogonal irradiation) step is accomplished by either rotating the substrate or beamlets. The Applicant has chosen to recite the "rotation" of beamlets in claim 1. As such, claim 1 now recites that the first step in the 2N-shot process is accomplished through the use of an aperture with a first orientation, and that the second step is accomplished with an aperture with orthogonal apertures, the subject matter of claim 2, now canceled. To further distinguish, claim 1 also recites that the 2N-shot process is accomplished without rotating the substrate, as disclosed by Sposili.

Section 22 of the Office Action of 9/19/2006 states that Yamazaki discloses the annealing of a Si film that has been covered with an oxide and exposed to a catalytic agent. The Office Action states that Yamazaki forms monodomain regions, and the use of lasers and heating

lamps. However, the Office Action makes no assertion that Yamazaki discloses a process based upon laser annealing a Si film using orthogonal apertures, such as the recited 2N-shot process.

Section 21 of the Office Action of 9/19/2006 states that Fukunaga discloses an annealing process that uses several laser shots and a nickel catalyst to crystallize a Si film. The Office Action also states that Fukunaga discloses the use of infrared lamps. However, the Office Action makes no assertion that Fukunaga discloses a process based upon laser annealing a Si film using orthogonal apertures, such as the recited 2N-shot process.

Section 22 of the Office Action of 9/19/2006 states that Kawasaki discloses lateral growth crystallization using thermal and laser processes and catalytic agents. However, the Office Action does not assert that Fukunaga discloses a process based upon laser annealing a Si film using orthogonal apertures, such as the recited 2N-shot process.

An invention is unpatentable if the differences between it and the prior art would have been obvious at the time of the invention. As stated in MPEP § 2143, the *KSR International Co. v Teleflex Inc.* decision (82 USPQ2d 1385, 1395-1397, 2007) suggests 7 exemplary rationales to support a conclusion of obviousness, which include:

A) Combining prior art elements according to known methods to yield predictable results;

B) Simple substitution of one known element for another to obtain predictable results;

C) Use of known technique to improve similar devices (methods, or products) in the same way;

D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

E) “Obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;

G) Some teaching, suggestion, or motivation in prior art would have lead one of ordinary skill to modify the prior art reference or the combine prior art references teachings to arrive at the claimed invention.

The Office Action states that modifications to Sposili would have been obvious to one of ordinary skill in the art in light of Yamazaki, Fukunaga, and Kawasaki. This rejection appears to be most closely grounded in the G) rationale - Some teaching, suggestion, or motivation in prior art would have lead one of ordinary skill to modify the prior art reference or the combine prior art references teachings to arrive at the claimed invention.

With respect to this rationale, MPEP 2143 (G) states that the rejection must articulate the following criteria to resolve the *Graham* factual analysis:

(1) a finding that there was some teaching, suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings;

(2) a finding that there was a reasonable expectation of success; and

(3) whatever additional findings based on the Graham factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

With respect to the above-referenced first factual analysis criteria, the Yamazaki/Fukunaga/Kawasaki references have been combined with Sposili based upon the assumption that Sposili makes obvious all the limitations recited in Applicant's claim 1. However as discussed above, Sposili does not disclose a 2N-shot process that uses orthogonal apertures, as recited in claim 1. Neither do Yamazaki, Fukunaga, or Kawasaki disclose such a limitation. Further, none of the above-mentioned references disclose the combination of performing a DS process in a second area, within the first area annealed by the 2N-shot process, as recited in claim 1. Therefore, even if elements from Yamazaki/Fukunaga/Kawasaki are combined with Sposili, that combination does not explicitly disclose the 2N-shot process or the combination of the 2N-shot and DS processes recited in claim 1. Claims 3-21, 23, and 25-44, dependent from claim 1, enjoy the same advantages.

The Office Action states that it would have been obvious to apply the subsequent process techniques of Yamazaki, Fukunaga, or Kawasaki with the sequential crystallization process taught by Sposili. However, this statement does not explain how a practitioner in the art could have modified Sposili in such a way as to describe the claimed invention.

A *prima facie* analysis is especially critical in the present circumstances since the rejection is predicated on limitations that are not explicitly disclosed in the prior art references. None of the four references disclose a 2N-shot process using a mask with orthogonal apertures. Neither do the references disclose a method that uses a combination of 2N-shot and DS processes. Therefore, the claim invention can only be obvious if an artisan makes substantial modifications to the Sposili reference. More particularly, the Yamazaki/Fukunaga/Kawasaki references must suggest a modification to Sposili that suggest a 2N-shot process using a mask with orthogonal apertures. The Yamazaki/Fukunaga/Kawasaki references must simultaneously suggest a modification to Sposili to perform a separate DS process following a 2N-shot process. However, there is nothing in the Yamazaki/Fukunaga/Kawasaki references that suggest such a modification.

Neither does the obviousness rejection provide evidence that such a modification would have been obvious to one with skill in the art based upon what was well known at the time of the invention. “(A)nalysis [of whether the subject matter of a claim would have been obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1740-41, 82 USPQ2d 1385, 1396 (2007). However, if the *prima facie* rejection is supported by what was known by a person of ordinary skill in the art then additional evidence should have been provided. Notable, when the source or motivation is not from the prior art references, “the evidence” of motive

will likely consist of an explanation or a well-known principle or problem-solving strategy to be applied”. *DyStar*, 464 F.3d at 1366, 80 USPQ2d at 1649. The Office Action does not supply evidence that it was well known at the time of the invention to use a mask with orthogonal apertures to perform a 2N-shot process at the time of the invention.

With respect to the second analysis criteria needed to support the G) obviousness rationale, even if an expert were given the Sposili, Yamazaki, Fukunaga, and Kawasaki references as a foundation, no evidence has been provided to show that there is a reasonable expectation of success in the claimed invention. That is, there can be no reasonable expectation of success if the references, and what was known by artisan at the time of the invention, do not teach all the limitations of the claimed invention.

In summary, the Applicant respectfully submits that a *prima facie* case of obvious has not been supported since Sposili does not explicitly disclose every limitation of claim 1. Neither has a case been supported that Sposili can be modified to supply the missing limitations in view of either Yamazaki/Fukunaga/Kawasaki, or what was well known by a person of skill at the time of the invention. Therefore, the Applicant requests that the rejection of claims 3-21, 23, and 25-44 be withdrawn.

In Section 7 of the Office Action claims 1-21, 23, and 25-44 haven been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-15 of US 6,921,443) Voutsas, in view of Sposili, Yamazaki, plus Fukunaga or Kawasaki. In

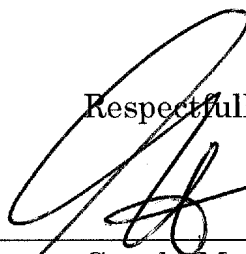
response, a Terminal Disclaimer is being filed currently with this paper to remove the Voutsas reference. Without the Voutsas reference the obviousness-type double patenting rejection cannot stand, and the Applicant requests that the rejection be withdrawn.

Claims 65-66 have been added. Support for the new claims can be found in the specification at page 5, lines 1-14 and page 8, line 1 through page 10, line 26.

Applicant asserts that the claims are patentable over the references made of record in Section 6 of the Office Action. It is believed that the application is in condition for allowance and reconsideration is earnestly solicited.

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Respectfully submitted,



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